BOOK REVIEW

JOHN BOIK. 2001. **Natural compounds in cancer therapy: promising natural & antitumor agents from plants & other natural sources.** (0-9648280-1-4, pbk.) Oregon Medical Press, LLC. 325 10th Avenue North, Princeton, Minnesota 55371, U.S.A. (Orders: 800-610-0768; www.ompress.can). $32.00, 521 pp., b/w charts, figures, graphs, and tables, 13 appendices, 8 1/2" × 11".

Seldom does one encounter a seminal work wherein the author tackles the enormously complex immune system, the intricacies of the pathophysiological process involved in malignancies, combined with a most articulate description of botanical and other sources, the constituents of which possess potent anti-neoplastic properties.

The book is divided into three parts: *Part I: Cancer at the Cellular Level*, is comprised of Chapters 2 through 6, and is preceded in Chapter 1 which presents background information related to Parts I and II, notably, the seven strategies for cancer inhibition; *Part II: Cancer at the Level of the Organism*, and *Part III: Clinical Considerations*.

The topics included in Part I consist of the following: Mutations, Gene Expression, and Proliferation (Chp. 2); Results of Therapy at the Cellular Level (Chp. 3); Growth Factors and Signal Transduction (Chp. 4); Transcription Factors and Redox Signaling (Chp. 5); and Cell-to-Cell Communication (Chp. 6).

Several interesting and salient points are stressed. The central driving force behind the transformation of a normal cell into a cancer cell is mutation; especially through the expression of oncogenes and decreased expression of tumor suppressor genes. Both normal and cancer cells proliferate in response to the same signals, but in cancer the proliferative signals exceed apoptotic signals. At the cellular level, successful cancer therapies (1) can cause cancer cells to assume more normal morphology and function, (2) prevention of cancer cells to enter the cell cycle, (3) induction of cell death through apoptosis, and (4) induction of cell death through necrosis. The first three of these can be accomplished by a variety of natural compounds. To avoid apoptosis and promote proliferation, cancer cells override the control mechanisms that normally regulate these processes in healthy cells. Often cancer cells produce their own growth factors, signal transduction enzymes, and protein moieties. Of the three major transcription factors, cancer cells rely on abnormally low P53 protein activity and abnormally high NF-Kappa B and AP-1 activity. Intercellular communication and cell-matrix interaction are vital processes linking a cell to its environment. Cancer cells frequently exhibit aberrant forms of communication. Increasing E-cadherin expression and increasing gap junction communication can provide useful strategies in cancer treatment.

Part II consists of Chapters 7 through 12. Topics covered include: overview of Angiogenesis (Chp. 7), Natural Inhibitors of Angiogenesis (Chp. 8), Invasion (Chp. 9, Metastasis (Chp. 10), The Immune System (Chp. 11), and Natural Compounds that Affect the Immune System (Chp. 12). A number of valuable observations were noted. While angiogenesis is a normal part of wound healing, it is the major mainstay supporting tumor growth. The difference between wound healing and tumor growth is th4a fact that angiogenesis in wound healing is finite and self-limiting but completely unchecked in tumors. A large number of compounds are capable of inhibiting angiogenesis, especially antioxidants, anticopper complexes, and vitamins A and D_3. Combinations including genistein have shown real promise. Cancer cells produce three compounds that facilitate invasion: abnormal matrix components, enzymes (collagenase and hyaluronidase) that digest matrix Components, and variant CD44 surface proteins that aid cell migration. Metastasis is a five-step process, namely, (1) cell detachment and intravasation, (2) migration through circulatory channels, (3) arrest at a new location, (4) extravasation, and (5) cell proliferation and angiogenesis. it is highly likely that natural compounds

could play a significant role in slowing down or abrogating metastasis. The response of the immune system to cancer involves two major processes: (1) innate immune response independent of the tumor antigens, and (2) adaptive immune responses. Ideal results have been achieved when an immunostimulant in combination with materials that prevent immune system evasion. Release of cytokines (IL-2 and the interferons) plus the addition of immune stimulants appear to have the greatest potential for therapy together with inhibitors of PGE 2 or other specific immunosuppressive compounds.

Part III consists of Chapters 13, through 23. Topics covered include: Back- ground for Part III (Chp. 13), Trace Metals (Chp. 14), Vitamin C and Antioxidants (Chp. 15), Polysaccharides (Chp. 16), Lipids (Chp. 17), Amino Acids and Related Compounds (Chp. 18), Flavonoids (Chp 19), Non-flavonoid Phenolic compounds (Chp. 20), Terpenes (Chp. 21), Lipid-soluble Vitamins (Chp 22), Natural Compounds, Chemotherapy, and Radiotherapy (Chp. 23). Cogent observations include the following. An approach which uses several compounds in combination may be associated with fewer side-effects and possibly superior beneficial actions. Selenium compounds tend to decrease cancer risk while copper and iron appear to increase cancer risk. Depending upon the oxidative stress at the cancer site, antioxidants may either increase or decrease cancer cell proliferation. Polysaccharides have been shown to increase immunostimulation through release of cytokines and to decrease immunosuppressive moieties. They very possibly have other mechanisms which result in tumor inhibition, but many of these mechanisms remain to be calrified. N-6 lipids tend to promote tumor progression, an action probably shared with saturated fats in general. Fish oil, however, especially EPA, has been shown to inhibit cancer progression, decrease angiogenesis, lessen evasion, tendency to metastasize, and inhibit cachexia by reducing TNF-alpha levels. Both glutamine and bromelain appear to have immunostimulant properties. Phenolic compounds, although chemically diverse, seem to be able to inhibit cancer progression through cytotoxic mechanisms. Curcumin, lignans, and quinones may have possible roles in cancer therapy, but they require further study to ascertain their activities. Terpenes probably serve as anticancer agents through potent anti-inflammatory actions. Vitamins A and D, and their metabolites, have the ability to enter the nucleus and directly affect gene transcription. Vitamin E, located on cell membranes, may play a major role in regulating antigen presentation. Combining natural product administration along with either chemotherapy and/or radiotherapy may enhance the efficacy of both modalities of treatment.

With such a wealth of information regarding the favorable effects of natural products in various processes cancer cells depict, it behooves all physicians, especially oncologists, other medical personnel, nutritionists and dietitians, and all persons who interact with cancer patients to peruse, assess, and incorporate those natural factors which they deem best aligned with their philosophical approaches to improve the statistics for cancer survival. But of even more import is for the information contained in this book to be available and utilized by cancer patients, themselves.

This book represents a truly remarkable compilation and assessment of natural products and their potential to significantly influence for good cancer therapies with increased survival of the disease's victims.—*Ivan E. Danhof, Ph.D., M.D., 222 S.W. 2nd Street, Suite 201, Grand Prairie, Texas 75051, U.S.A.*